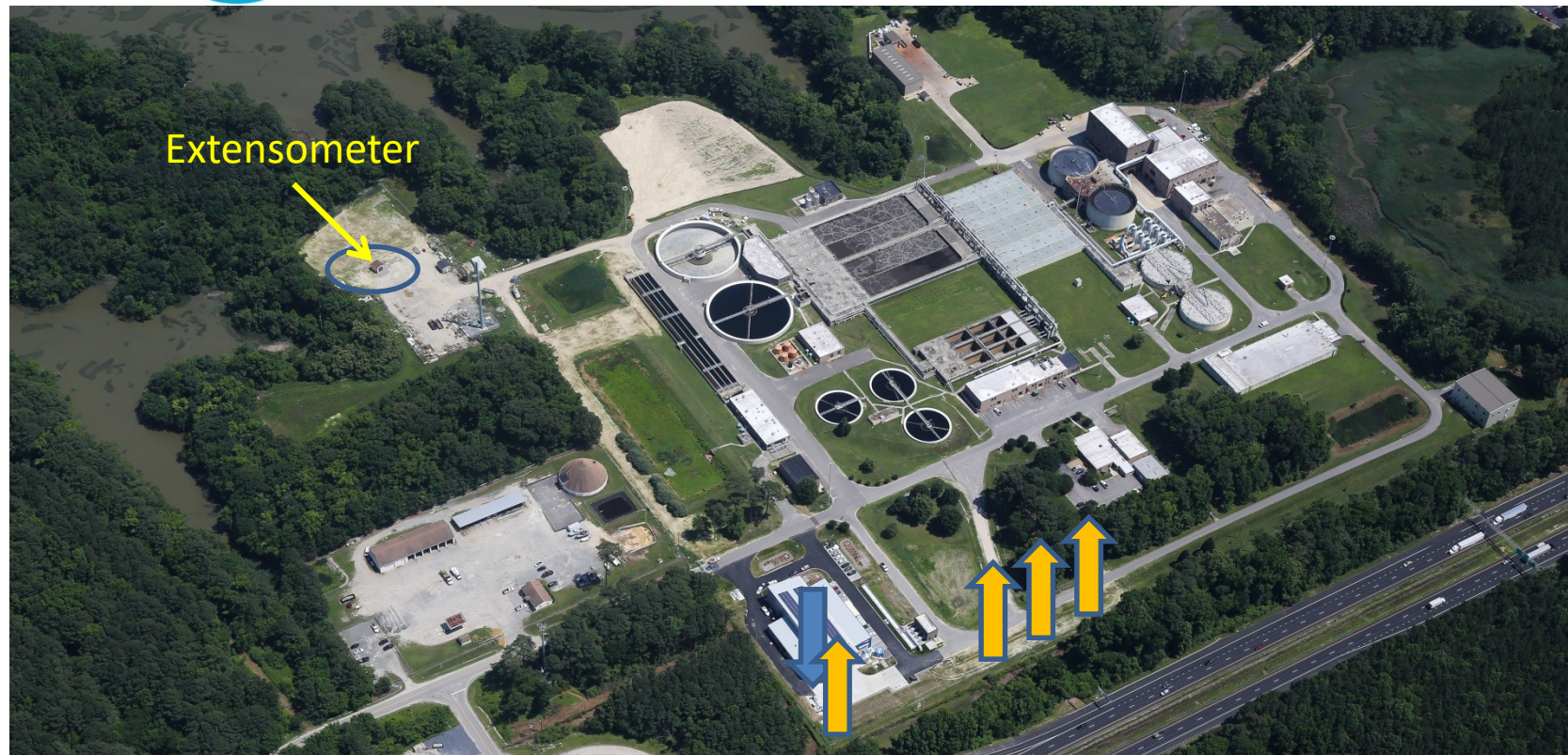


One Initiative – Many Benefits

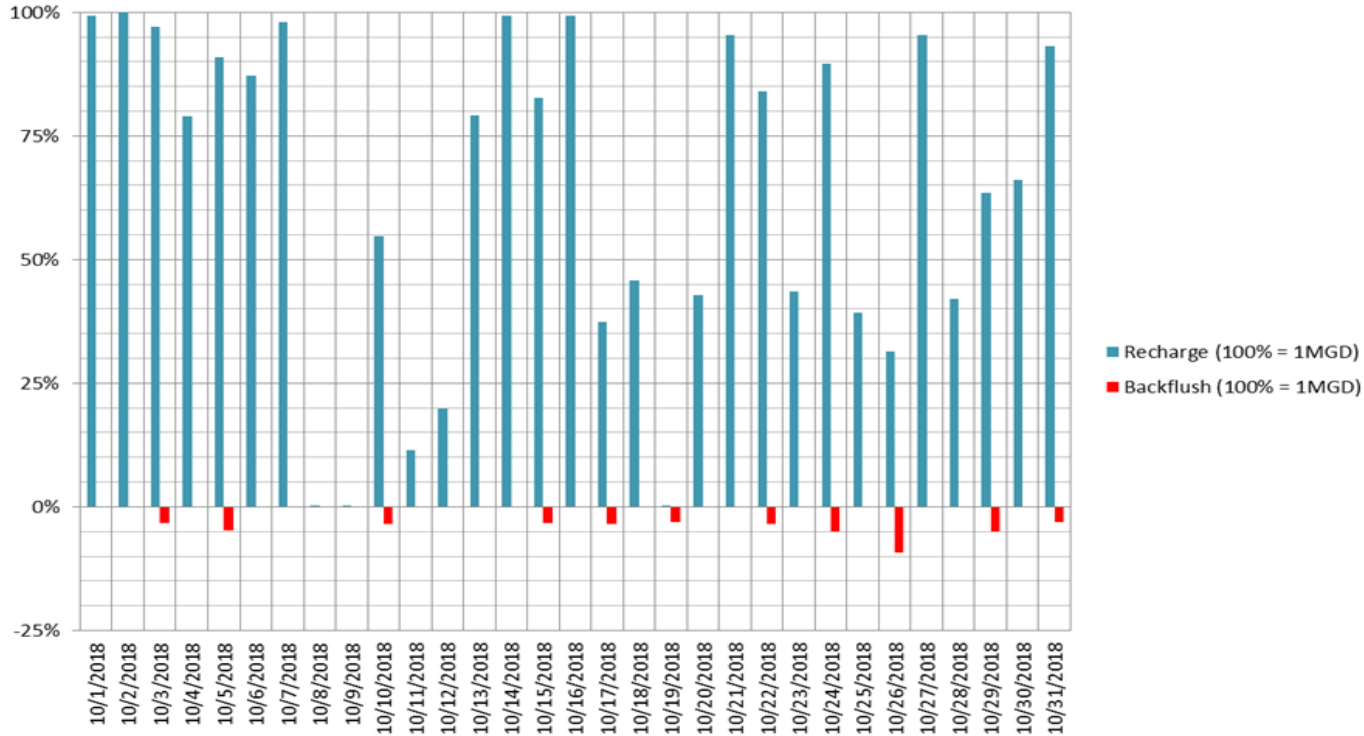








Total Recharge October: 19.8 MG
Total Backflush October: 0.47 MG
October Average: 0.64 MGD





Parameter	May	June	July	August	SWIFT Water Target
Total Nitrogen, mg/L	3.1 Avg; 4.0 Max	4.0 Avg; 5.2 Max	3.2 Avg; 3.5 Max	4.2 Avg; 5.7 Max	5 mg/L Monthly Average; 8 mg/L Daily Maximum
Total Organic Carbon (TOC), mg/L	0.53 Avg; 3.1 Max	0.37 Avg; 0.56 Max	0.50 Avg; 0.57 Max	1.3 Avg; 1.4 Max	4 mg/L Monthly Average; 6 mg/L Maximum
Nitrite, mg/L	0.34 Avg; 0.92 Max	0.82 Avg; 1.35 Max	0.05 Avg; 0.27 Max	0.04 Avg; 0.32 Max	1
Bromate, ug/L	0.150	1.97	2.17	3.14	10
Antimony, ug/L	<0.20	0.21	<1.00	ND	6
Arsenic, ug/L	0.98	0.41	0.40	ND	10
Barium, mg/L	0.01	0.01	0.01	<0.005	2
Fluoride, mg/L	0.88	0.70	1.0	0.91	4.0
TDS, mg/L	622	666	719	632	NA

Unregulated Chemical Constituents – Early SWIFT Results

Chemical	Criterion ¹	Carbon-based Train FW Conc.	Notes
Cotinine	1 µg/L	<0.010 µg/L ²	Surrogate for low MW, partially charged cyclics
Primidone	10 µg/L	< 0.005 µg/L ²	
Phenyltoin	2 µg/L	No data	
Meprobamate	200 µg/L	< 0.005 µg/L ²	High occurrence in WWTP effluent
Atenolol	4 µg/L	< 0.005 µg/L ²	
Carbamazepine	10 µg/L	< 0.005 µg/L ²	Unique structure
Estrone	320 µg/L	< 0.005 µg/L ²	Surrogate for steroids
Sucralose	150 mg/L	Range: <0.1 to 61 µg/L (GAC1) Range: <0.1 to 0.32 µg/L (GAC2)	Surrogate for water soluble, uncharged chemicals, moderate MW
Triclosan	2100 µg/L	<0.010 µg/L ²	Chemical of interest

1. In most cases, criterion based on drinking water equivalent concentration for lowest therapeutic dose divided by 1,000 or 10,000 to provide a safety factor.
2. Based on 8 samples in finished water



Unregulated Chemical Constituents – Early SWIFT Results

Chemical	Criterion	Carbon-based Train Conc.	Notes
1,4-Dioxane	1 µg/L	0.34-0.39 µg/L ¹	CCL3; CA Notification limit
17-B-estradiol	TBD (ng/L range)	<0.005 µg/L ²	CCL3
DEET	200 µg/L	<0.010 µg/L ²	Minnesota Health guidance value
Ethinyl Estradiol	TBD (ng/L range)	<0.005 µg/L ²	CCL3
NDMA	10 ng/L	6.6 -14 ng/L ³	CCL3; CA Notification limit
Perchlorate	6 µg/L	< 4 µg/L ⁴	CA Notification limit
PFOA +PFOS	70 ng/L	< 60 ng/L ⁵	USEPA Health Advisory
TCEP	5 µg/L	<0.010 µg/L ²	Minnesota Health guidance value

Table 5: SWIFT Water Quality and LRV Compliance

Parameter	Units	MCL	Detection Limit ¹	Required Monitoring Frequency	MAY		JUNE		JULY		AUGUST	
					SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum
Regulatory Parameters												
Total Nitrogen (TN)	mg/L	-	0.50	Daily	3.15 (16)	4.03	3.70 (29)	5.21	3.48 (30)	5.48	4.98 (13)	7.36
NO ₃	mg/L	10	0.01	Daily	2.14 (16)	2.83	2.54 (28)	3.17	3.00 (30)	4.39	4.04 (13)	5.15
NO ₂	mg/L	1	0.01	Daily	0.43 (16)	0.92	0.82 (28)	1.35	0.05 (30)	0.27	0.02 (13)	0.07
Turbidity	NTU	1 NTU		Continuous	See Figure 1							
Total Organic Carbon (TOC)	mg/L	-	0.10	3x/Vwk	0.26 (6)	0.32	0.37 (12)	0.56	0.84 (13)	1.26	1.50 (7)	1.68
pH		6.5-8.5		Continuous	See Figure 2							
TDS	mg/L	500	2.5	Monthly		671		738		719		632
Microorganisms												
Total Coliform ³	MPN/100 mL	0	1	Daily	<1 (14)	<1	<1 (26)	<1	<1 (29)	<1	<1 (12)	<1
E. coli	MPN/100 mL	0	1	Weekly	<1 (2)	<1	<1 (2)	<1	<1 (3)	<1	<1 (4)	<1
Cryptosporidium	oocysts/L	0	0.095	Quarterly					<0.095 (2)	<0.095		
Giardia lamblia	oocysts/L	0	0.095	Quarterly					<0.095 (2)	<0.095		
Legionella	MPN/100 mL	0	10	Quarterly						<10		
Disinfection Byproducts												
Bromate	µg/L	10	0.15	Monthly ⁴		0.150		1.97		2.17		3.14
Chlorite	mg/L	1	0.100	Monthly		<0.100		<0.300		<0.100		<0.100
Trihalomethanes												
Bromodichloromethane	µg/L	0	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Bromoform	µg/L	0	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Chloroform	µg/L	70	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Dibromochloromethane	µg/L	60	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
HAAs												
Dichloroacetic acid	µg/L	0	1	Monthly		<1		<1		<0.2		<1
Trichloroacetic acid	µg/L	20	1	Monthly		<1		<1		<0.5		<1
Monochloroacetic acid	µg/L	70	2	Monthly		<2		<2		<2		<2
Bromoacetic acid	µg/L	-	1	Monthly		<1		<1		<0.3		<1
Dibromoacetic acid	µg/L	-	1	Monthly		<1		<1		<0.3		<1
Disinfectants												
Monochloramine (as Cl ₂) ⁵	mg/L	4 (mg/L)		Continuous	0.521		0.654		0.304		0.113	
Chlorine (as Cl ₂) ⁵	mg/L	4 (mg/L)		Continuous	0.523		0.636		0.449		0.202	

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FT Water Quality and LRV Compliance

1. Water Quality and Environmental Compliance					MAY		JUNE		JULY		AUGUST	
Parameter	Units	MCL	Detection Limit ¹	Required Monitoring Frequency	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum
Inorganic Chemicals												
Antimony	µg/L	6	2.00	Monthly		<2.00		0.21		<1.00		<2.00
Arsenic	µg/L	10	0.10	Monthly		0.98		0.41		0.40		<1.00
Asbestos	MFL	7	0.2	Monthly		<0.18		<0.2		<0.2		<0.2
Barium	mg/L	2	0.005	Monthly		0.008		0.005		0.005		<0.005
Beryllium	µg/L	4	0.10	Monthly		<0.10		<0.10		<0.10		<0.50
Cadmium	µg/L	5	0.10	Monthly		<0.10		<0.10		<0.10		<0.50
Chromium (total)	µg/L	100	2.00	Monthly		<2.00		<2.00		<2.00		<1.00
Copper	mg/L	1.3	0.005	Monthly		<0.005		<0.005		<0.005		<0.005
Cyanide (total)	mg/L	0.2	0.010	Monthly		<0.010		<0.010		<0.010		<0.010
Fluoride	mg/L	4	0.05	Monthly		0.88		0.70	1.01 (21)	1.15	0.90 (13)	1.04
Lead	µg/L	15	0.10	Monthly		<0.10		<0.10		<0.10		<1.00
Mercury	µg/L	2	0.10	Monthly		<0.10		<0.10		<0.10		<0.10
Selenium	µg/L	50	5.00	Monthly		<5.00		<5.00		<5.00		<25.0
Thallium	µg/L	2	0.10	Monthly		<0.10		<0.10		<0.10		<0.50
Organic Chemicals												
Acrylamide	µg/L	0	0.1	Monthly		Footnote 6	<0.1	<0.1		<0.1		<0.1
Alachlor	µg/L	200	0.05	Monthly		<0.05		<0.05		<0.05		<0.05
Atrazine	µg/L	300	0.05	Monthly		<0.05		<0.05		<0.05		<0.05
Benzo(a)pyrene (PAHs)	µg/L	0.2	0.02	Monthly		<0.02		<0.02		<0.02		<0.02 (LE)
Di(2-ethylhexyl) adipate	µg/L	400	0.6	Monthly		<0.6		<0.6		<0.6		<0.6
Di(2-ethylhexyl) phthalate	µg/L	6	0.6	Monthly		<0.6		<0.6		<0.6		<0.6
Hexachlorocyclopentadiene	µg/L	50	0.05	Monthly		<0.05		<0.05		<0.05		<0.05
Hexachlorobenzene	µg/L	1	0.05	Monthly		<0.05		<0.05		<0.05		<0.05
Simazine	µg/L	4	0.05	Monthly		<0.05		<0.05		<0.05		<0.05
Carbofuran	µg/L	40	0.5	Monthly		Footnote 6		<0.5		<0.5		<0.5
Oxamyl (Vydate)	µg/L	200	0.5	Monthly		Footnote 6		<0.5		<0.5		<0.5
Chlordane	µg/L	200	0.1	Monthly		<0.1		<0.1		<0.1		<0.1
Endrin	µg/L	2	0.01	Monthly		<0.01		<0.01		<0.01		<0.01



ter Quality and LRV Compliance

Parameter	Units	MCL	Detection Limit ¹	Required Monitoring Frequency	MAY		JUNE		JULY		AUGUST	
					SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum
Heptachlor	µg/L	0.4	0.01	Monthly		<0.01		<0.01		<0.01		<0.01
Heptachlor Epoxide	µg/L	0.2	0.01	Monthly		<0.01		<0.01		<0.01		<0.01
Lindane	µg/L	0.2	0.01	Monthly		<0.01		<0.01		<0.01		<0.01
Methoxychlor	µg/L	40	0.05	Monthly		<0.05		<0.05		<0.05		<0.05
Toxaphene	µg/L	3	0.5	Monthly		<0.5		<0.5		<0.5		<0.5
AR1016	µg/L	0.5	0.08	Monthly		<0.08		<0.08		<0.08		<0.08
AR1221	µg/L	0.5	0.1	Monthly		<0.1		<0.1		<0.1		<0.1
AR1232	µg/L	0.5	0.1	Monthly		<0.1		<0.1		<0.1		<0.1
AR1242	µg/L	0.5	0.1	Monthly		<0.1		<0.1		<0.1		<0.1
AR1248	µg/L	0.5	0.1	Monthly		<0.1		<0.1		<0.1		<0.1
AR1254	µg/L	0.5	0.1	Monthly		<0.1		<0.1		<0.1		<0.1
AR1260	µg/L	0.5	0.1	Monthly		<0.1		<0.1		<0.1		<0.1
Polychlorinated biphenyls (PCBs)	µg/L	0.5	0.68	Monthly		<0.68		<0.68		<0.68		<0.68
2,4-D	µg/L	70	0.1	Monthly		Footnote 6		<0.1		<0.1		<0.1
Dalapon	µg/L	200	1.0	Monthly		Footnote 6		<1		<1		<1
Picloram	µg/L	500	0.1	Monthly		Footnote 6		<0.1		<0.1		<0.1
2,4,5-TP (Silvex)	µg/L	50	0.2	Monthly		Footnote 6		<0.2		<0.2		<0.2
Dinoseb	µg/L	7	0.2	Monthly		Footnote 6		<0.2		<0.2		<0.2
Pentachlorophenol	µg/L	1	0.04	Monthly		Footnote 6		<0.04		<0.04		<0.04
Dioxin (2,3,7,8-TCDD)	pg/L	30	5.0	Monthly		Footnote 6		<5.0		<3.8		<5.0
Diquat	µg/L	20	0.4	Monthly		<0.4		<0.4		<0.4		<0.4
Endothall	µg/L	100	5	Monthly		Footnote 6		<5		<5		<5
Epichlorohydrin	µg/L	0	0.4	Monthly		<0.4		<0.4		<0.4		<0.4
Glycophosphate	µg/L	700	6	Monthly		Footnote 6		<6		<6		<6
Benzene	µg/L	5	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Carbon Tetrachloride	µg/L	5	1.00	Monthly		<1.00		<1.00		<1.00		<1.00

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Water Quality and LRV Compliance

Parameter	Units	MCL	Detection Limit ¹	Required Monitoring Frequency	MAY		JUNE		JULY		AUGUST	
					SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum
Chlorobenzene	µg/L	100	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
1,2-dibromo-3-chloropropane (DBCP)	µg/L	0.2	0.020	Monthly		<0.020		<0.020		<0.020		<0.020
o-Dichlorobenzene	µg/L	600	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
p-Dichlorobenzene	µg/L	75	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
1,2-Dichloroethane	µg/L	7	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
1,1-Dichloroethylene	µg/L	70	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
cis-1,2-Dichloroethylene	µg/L	70	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
trans-1,2-Dichloroethylene	µg/L	100	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Dichloromethane	µg/L	5	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
1,2-Dichloropropane	µg/L	5	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Ethylbenzene	µg/L	700	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Ethylene Dibromide (EDB)	µg/L	0.05	0.020	Monthly		<0.20		<0.20		<0.20		<0.20
Styrene	µg/L	100	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Tetrachloroethylene	µg/L	5	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Toluene	µg/L	1,000	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
1,2,4-Trichlorobenzene	µg/L	70	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
1,1,1-Trichloroethane	µg/L	200	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
1,1,2-Trichloroethane	µg/L	5	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Trichloroethylene	µg/L	5	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Vinyl Chloride	µg/L	2	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
p/m-Xylene	µg/L	-	2.00	Monthly		<2.00		<2.00		<2.00		<2.00
o-Xylene	µg/L	-	1.00	Monthly		<1.00		<1.00		<1.00		<1.00
Total Xylene	µg/L	10,000	3.00	Monthly		<3.00		<3.00		<3.00		<3.0
Radionuclides												
Alpha particles	pCi/L	15	3	Monthly		<3		<3		<3		<3
Beta particles and photon emitters	pCi/L	4 (milli-rems/yr)	3	Monthly		16		18		18		15
Radium 226	pCi/L	5	0.1	Monthly		<0.928		<1 (L2)		<1 (B1)		<1
Radium 228	pCi/L	5	0.1	Monthly		<0.864		<1 (L1)		<1 (B1)		<1
Uranium	µg/L	30	0.100	Monthly		<0.100		<0.100		<0.100		<0.100
Strontium-90	pCi/L	-	varies	Monthly		<1.61		<0.595		<0.514		<0.548
Tritium	pCi/L	-	346	Monthly		Footnote 6		<346		Footnote 7	<332 (2)	<332

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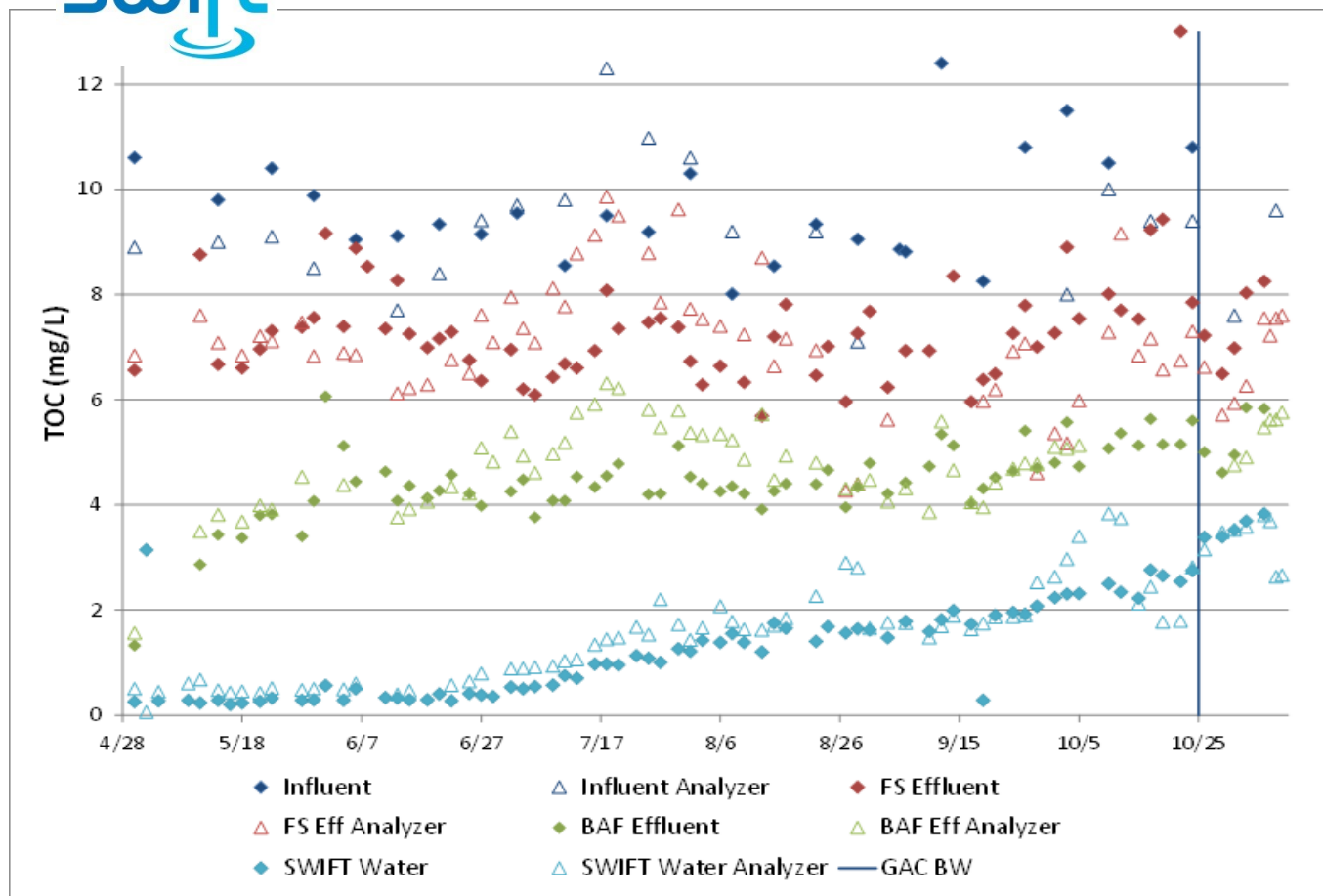


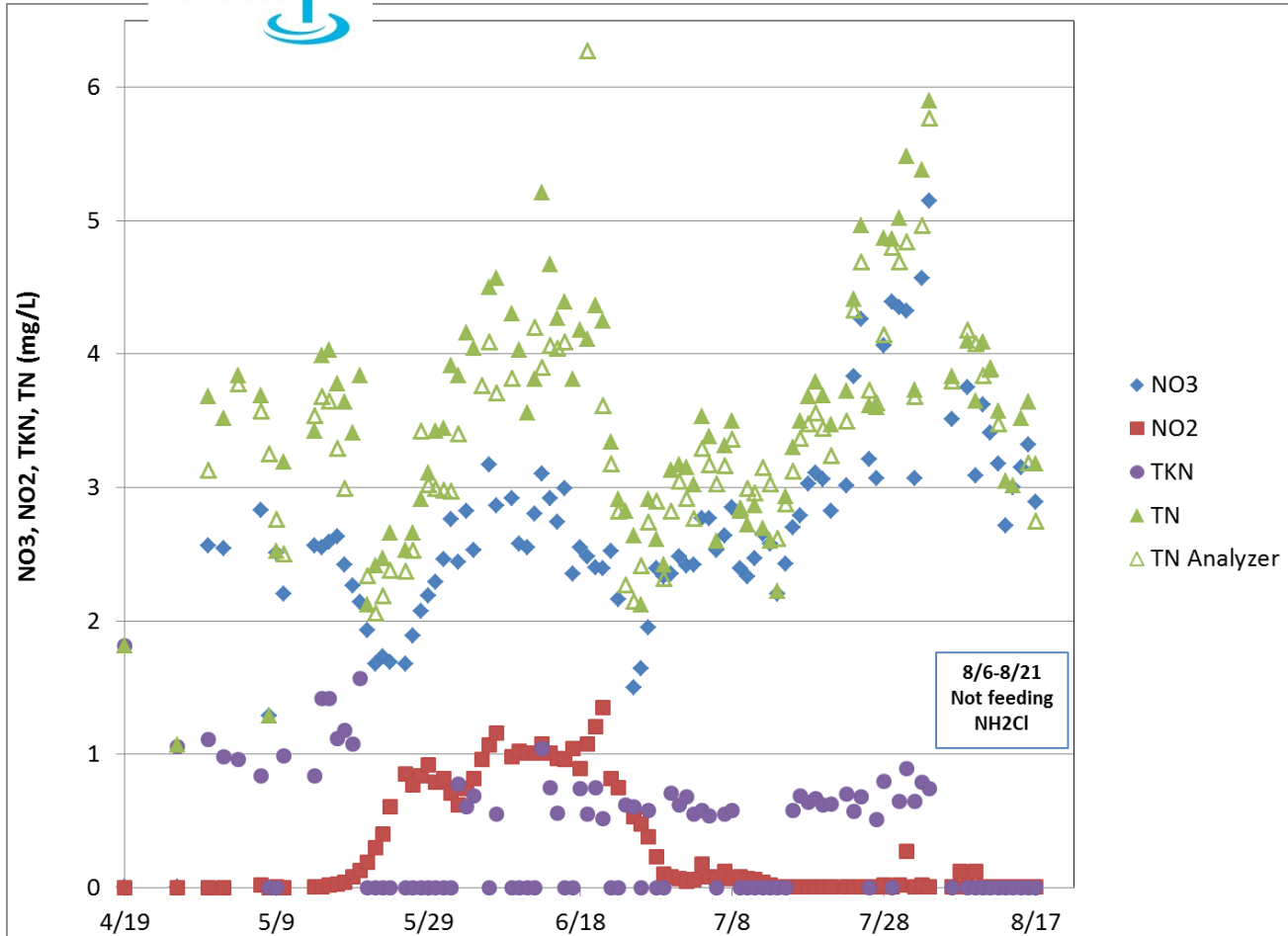
Water Quality and LRV Compliance

					MAY		JUNE		JULY		AUGUST	
Parameter	Units	MCL	Detection Limit ¹	Required Monitoring Frequency	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum	SWIFT Water Average (#samples) ²	SWIFT Water Maximum
Non-regulatory Performance Indicators												
Public Health Indicators												
1,4-dioxane	µg/L	-	0.07	Quarterly		<0.07			0.39 (4)	0.42	0.31 (3)	0.33
17-β-estradiol	ng/L	-	0.4	Quarterly								
DEET	ng/L	-	10	Quarterly								
Ethinyl estradiol	ng/L	-	5	Quarterly								
Tris(2-carboxyethyl)phosphine (TCEP)	ng/L	-	10	Quarterly	<2 (2)	<2	<2 (3)	2.4	<2 (4)	<2	<2 (2)	<2
NDMA	ng/L	-	2.0	Quarterly								
Perchlorate	µg/L	-	0.5	Quarterly								
Perfluorooctanoic Acid (PFOA)	µg/L	-	0.02	Quarterly								
Perfluorooctanesulfonic Acid (PFOS)	µg/L	-	0.04	Quarterly		<0.04				<0.04		
Treatment Efficacy Indicators												
Cotinine	ng/L	-	10	Quarterly						<10		
Primidone	ng/L	-	10	Quarterly								
Phenytoin (Dilantin)	ng/L	-	20	Quarterly								
Meprobamate	ng/L	-	5	Quarterly								
Atenolol	ng/L	-	5	Quarterly								
Carbamazepine	ng/L	-	5	Quarterly								
Estrone	ng/L	-	5	Quarterly								
Sucralose	ng/L	-	5	Quarterly								
Triclosan	ng/L	-	10	Quarterly								
Additional Monitoring (Ozone & UV LRV)					SWIFT Water Average	SWIFT Water Minimum	SWIFT Water Average	SWIFT Water Minimum	SWIFT Water Average	SWIFT Water Minimum	SWIFT Water Average	SWIFT Water Minimum
Ozone Virus LRV				Continuous	5.22	3.32	5.63	2.75 ⁹	5.68	0 ^{8,9}	4.26	2.59 ⁹
Ozone Giardia LRV				Continuous	2.73	1.68 ⁹	2.54	1.09 ⁹	2.38	0 ^{8,9}	2.06	1.13 ⁹
UV Dose Reactor 1	m.J/cm ²			Continuous	>186	>186	>186	>186	>186	>186	>186	>186
UV Virus LRV Reactor 1				Continuous	>4	>4	>4	>4	>4	>4	>4	>4
UV Dose Reactor 2	m.J/cm ²			Continuous	>186	>186	>186	>186	>186	>186	>186	>186
UV Virus LRV Reactor 2				Continuous	>4	>4	>4	>4	>4	>4	>4	>4

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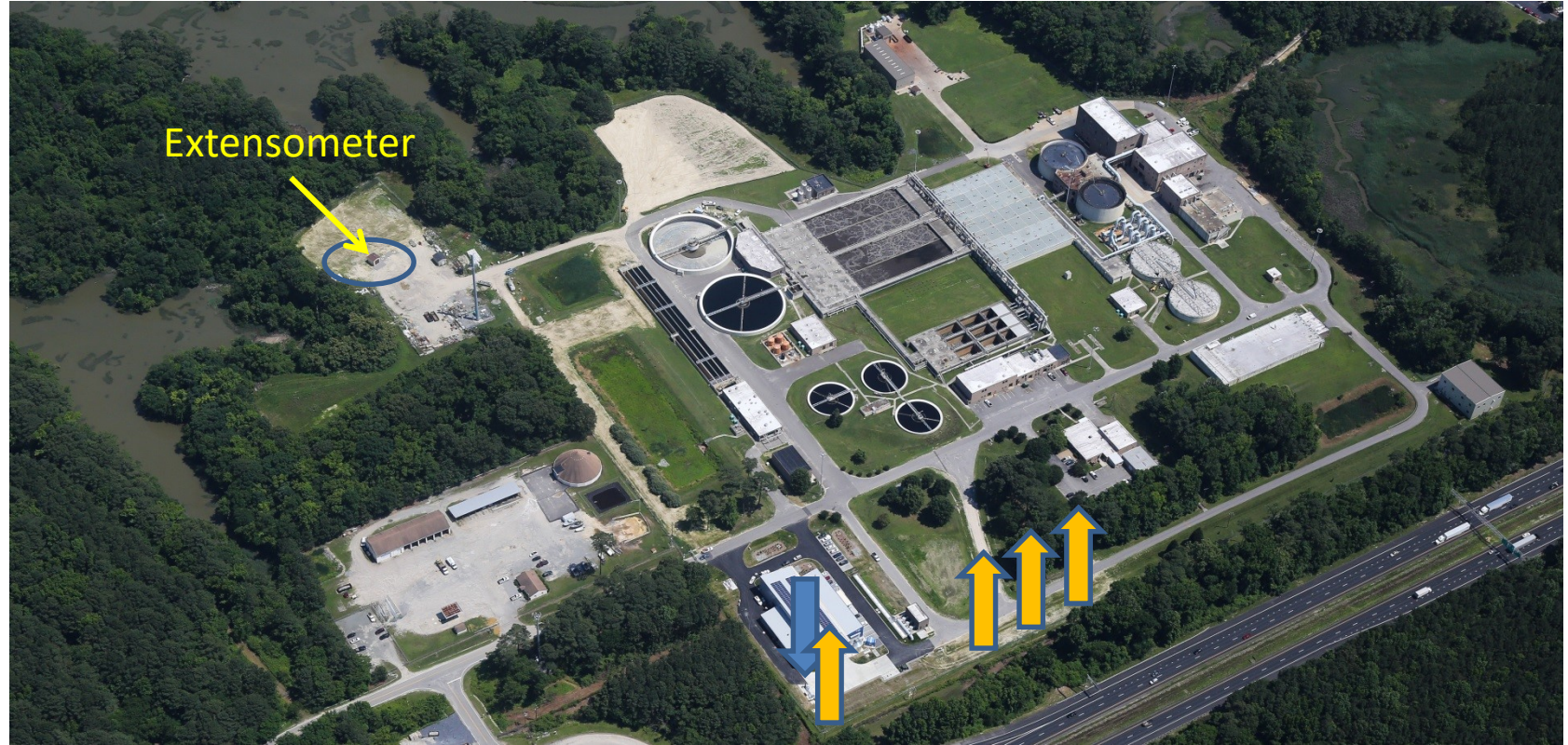


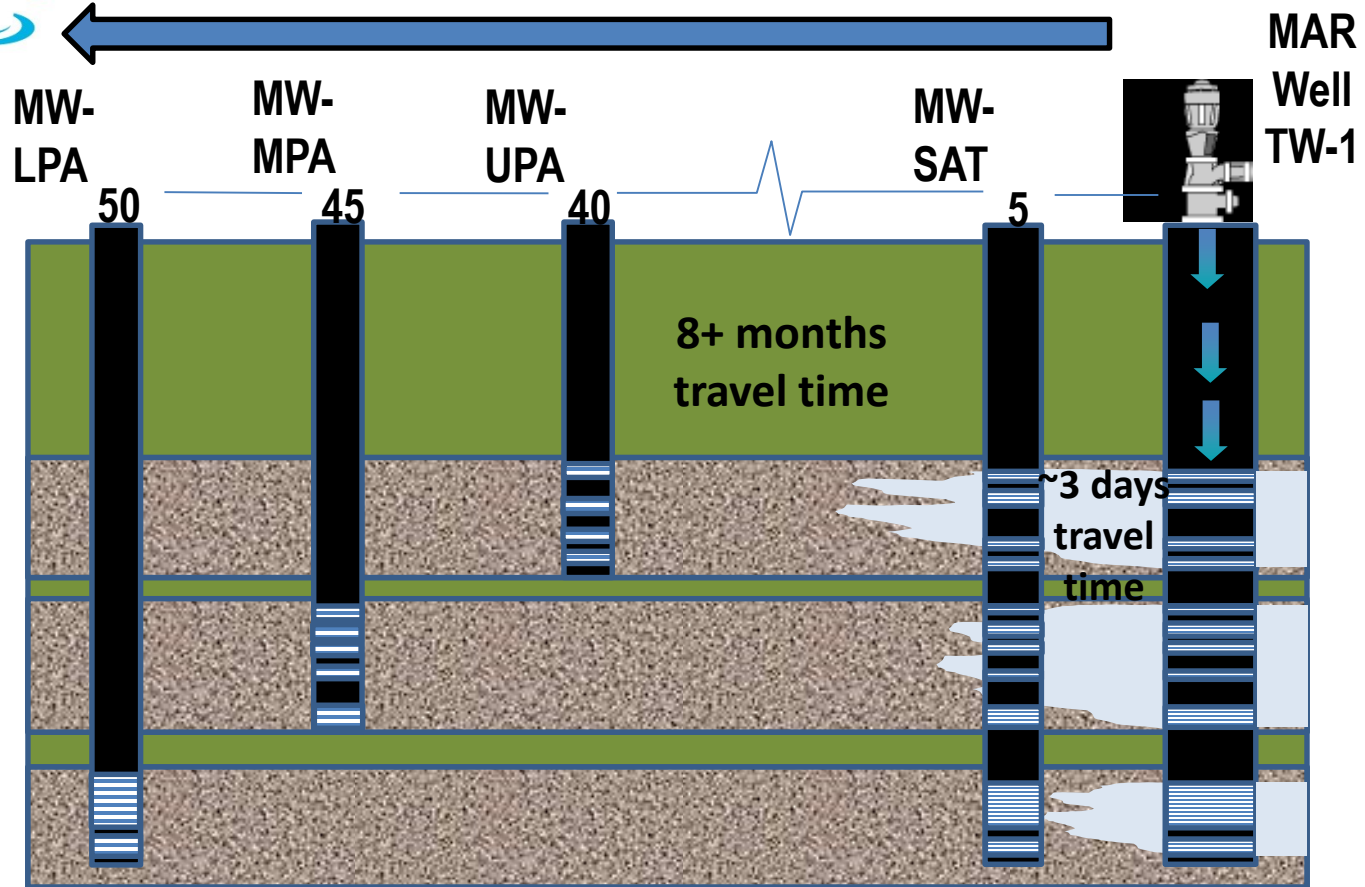
• TN Limits

- 5 mg/L Monthly Average
- 8 mg/L Daily Max

• SWIFT Water TN consistently below limits

• NO₂ increased and subsequently decreased after filters began to nitrify

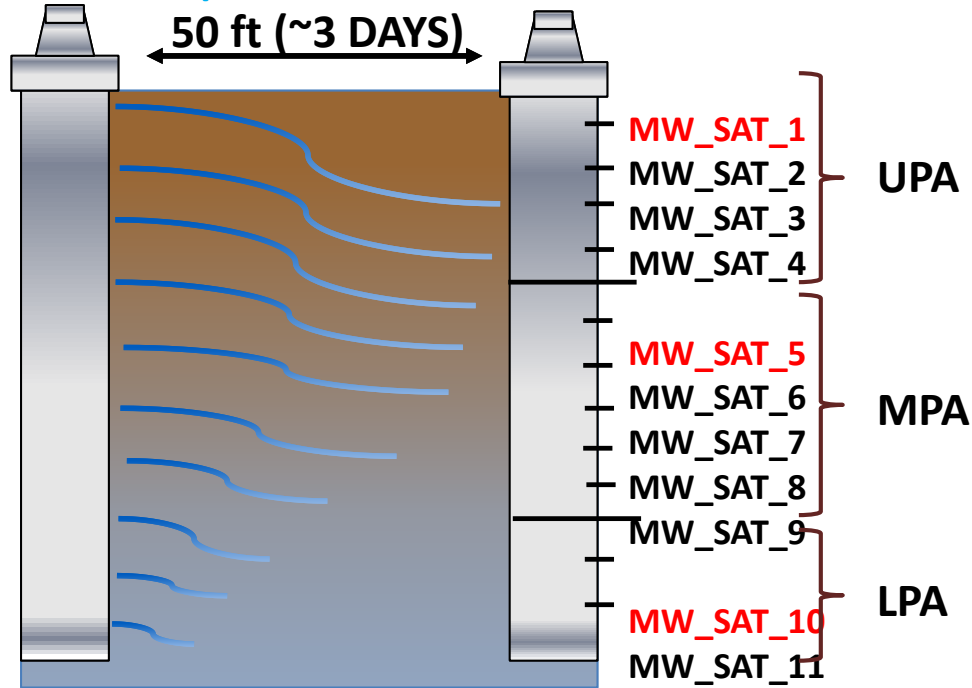




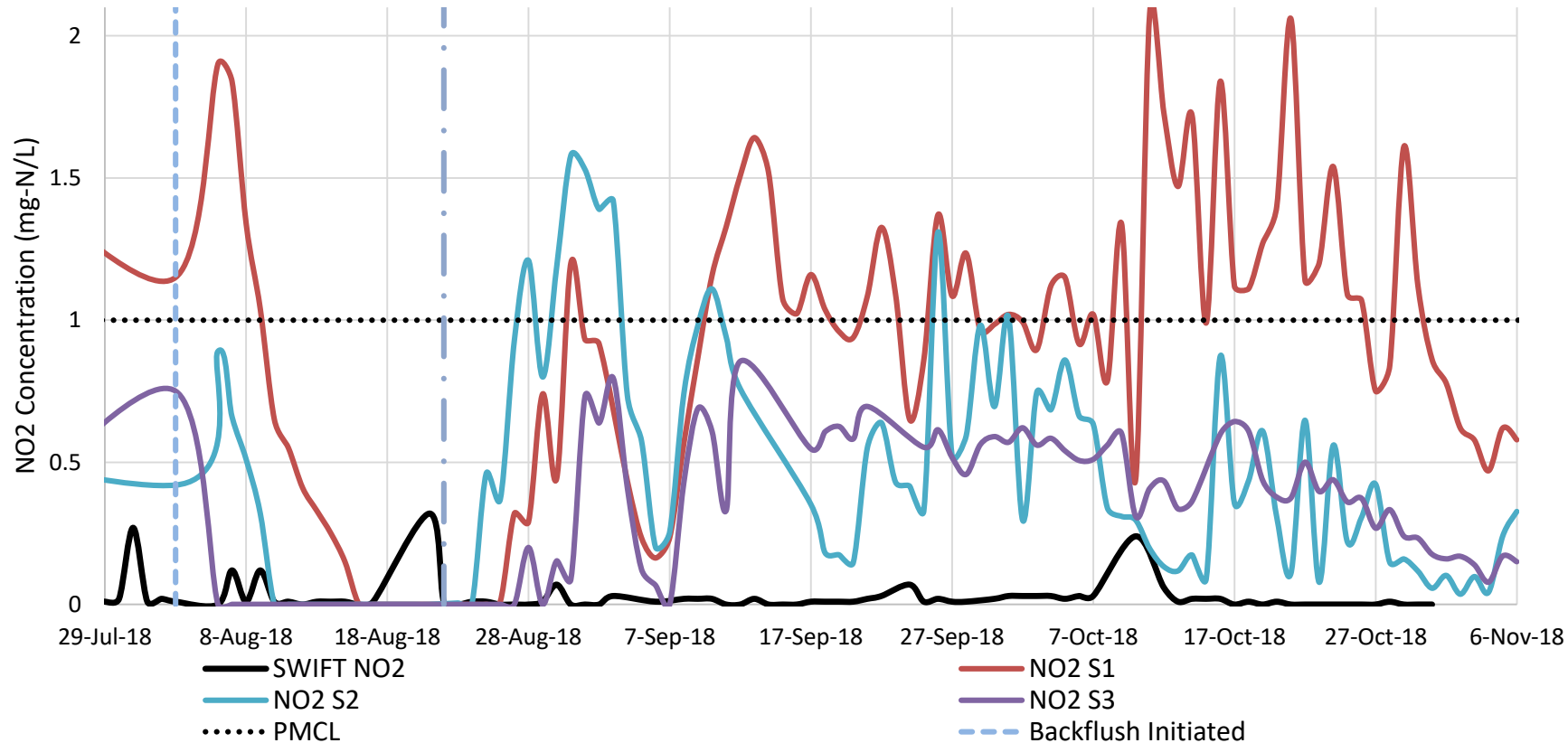


Recharge
Well
(SWIFT Water)

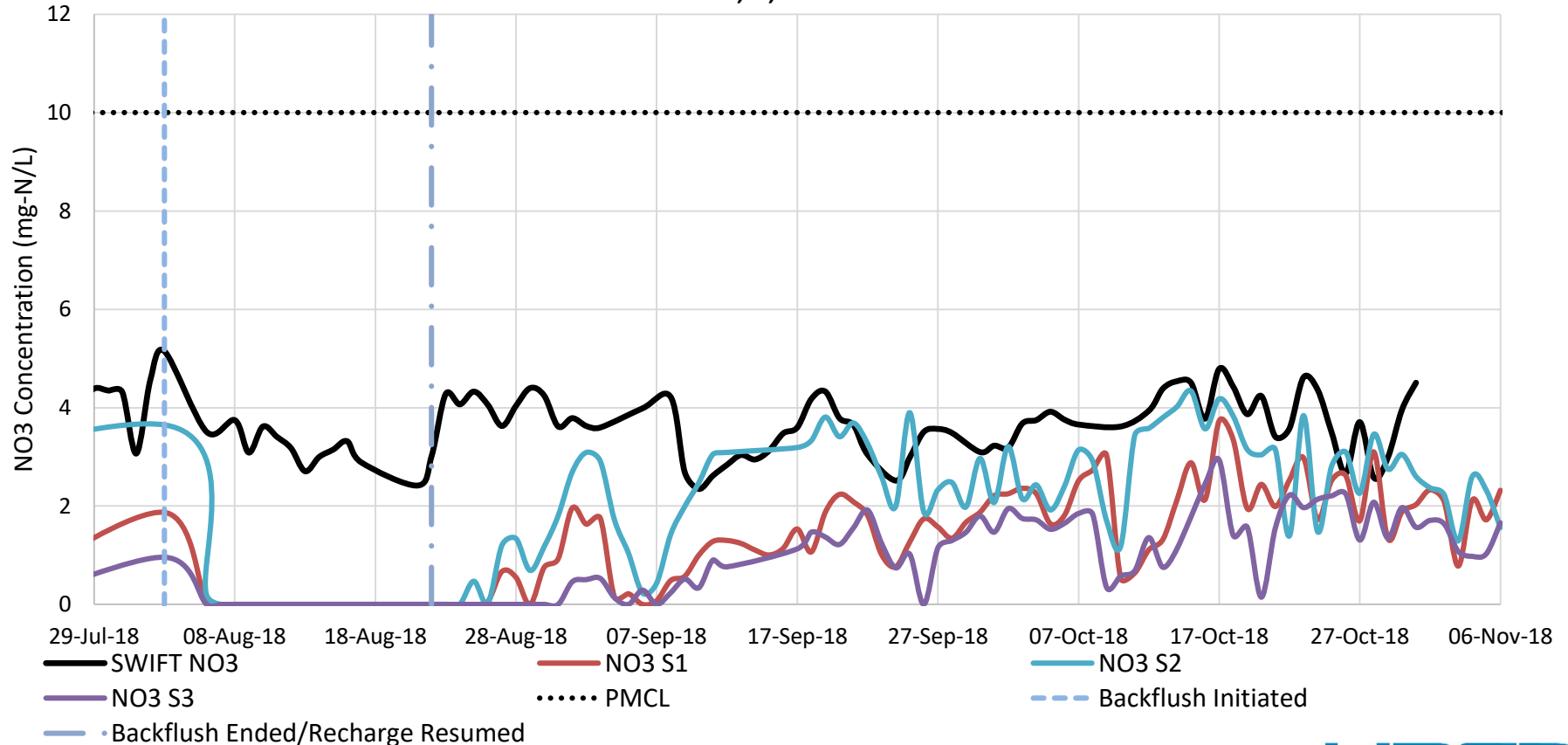
Monitoring Well
(MW_SAT)

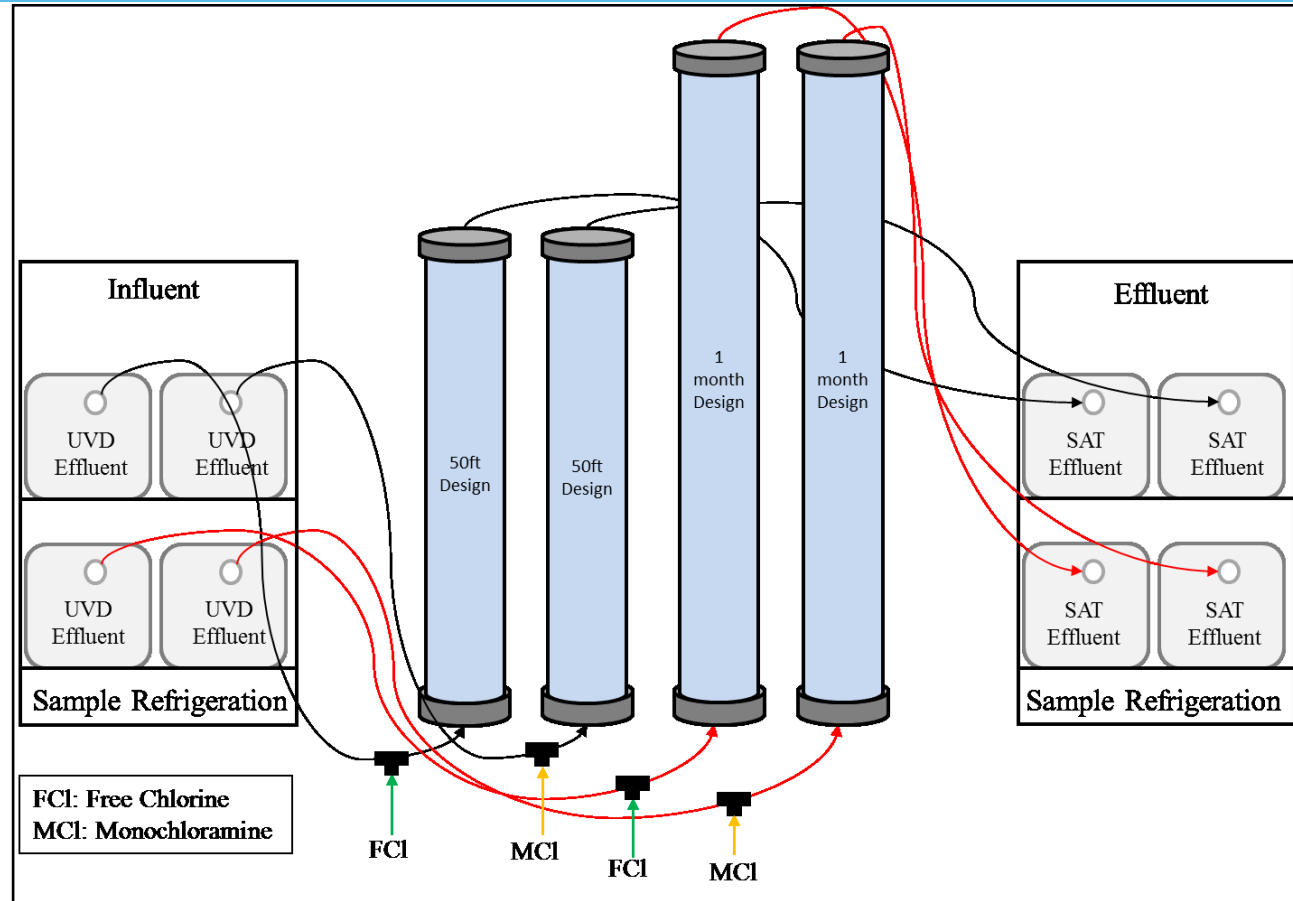


Screens 1,2, & 3 Nitrite



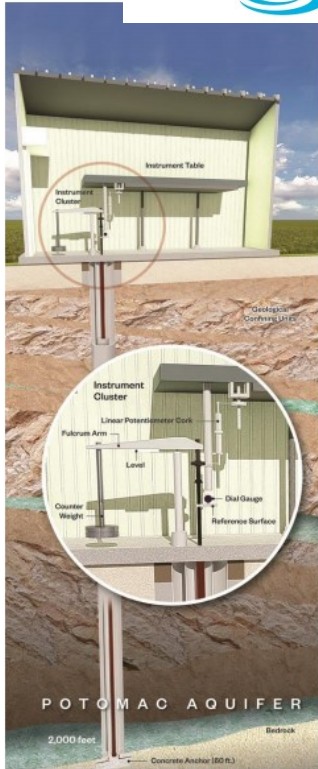
Screens 1,2, & 3 Nitrate





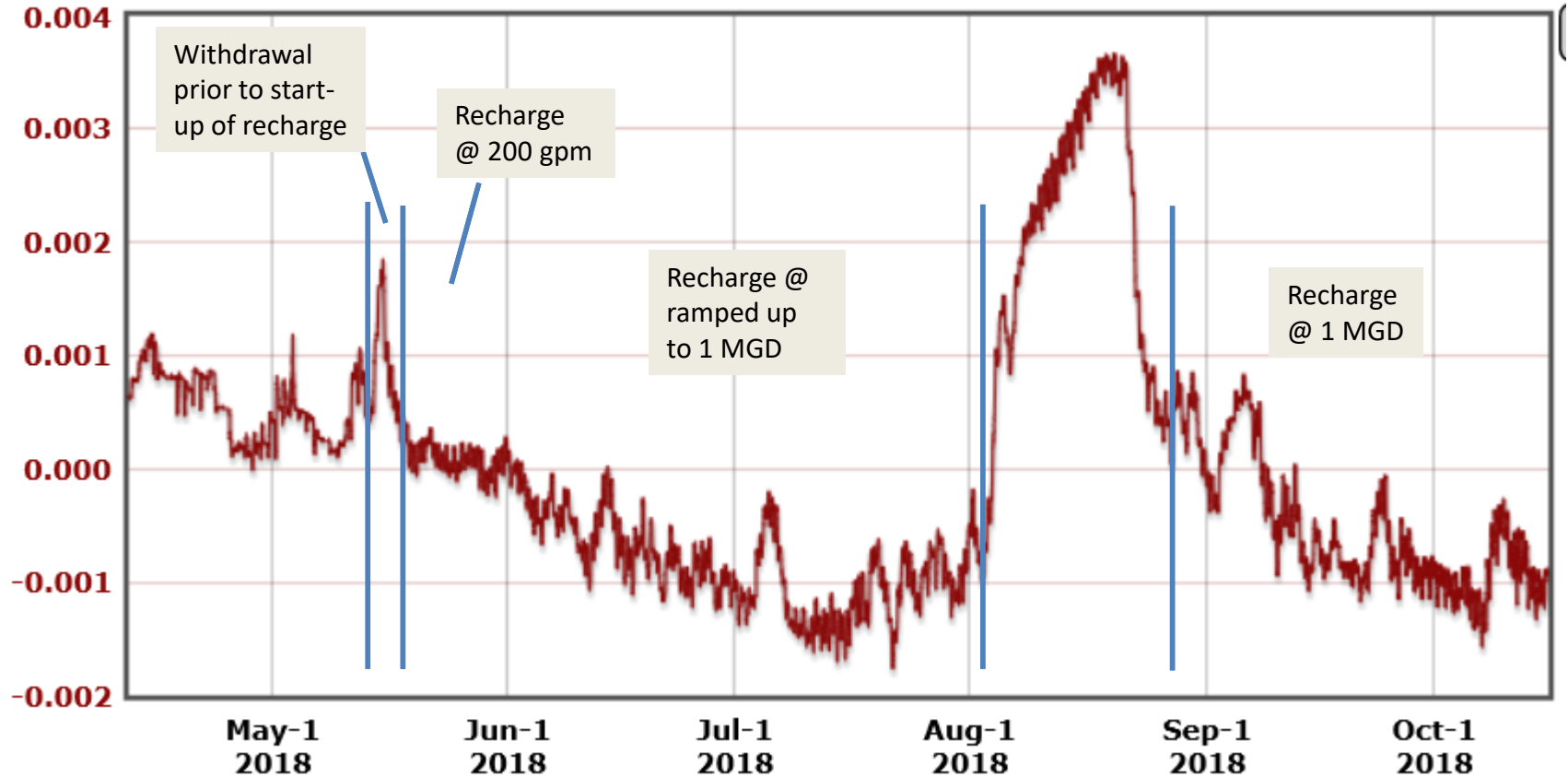
Extensometer Site





USGS geologists will analyze data produced by an extensometer installed at the SWIFT Research Center to determine changes in land subsidence.







Regulatory Framework



- Planning to re-introduce at GA
- Monitoring lab moving forward with agreement between ODU, VT and HRSD



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